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OBSERVATIONS ON THE ACTINOMORPHIC FORM OF *CLITORIA TERNATEA* LINN.

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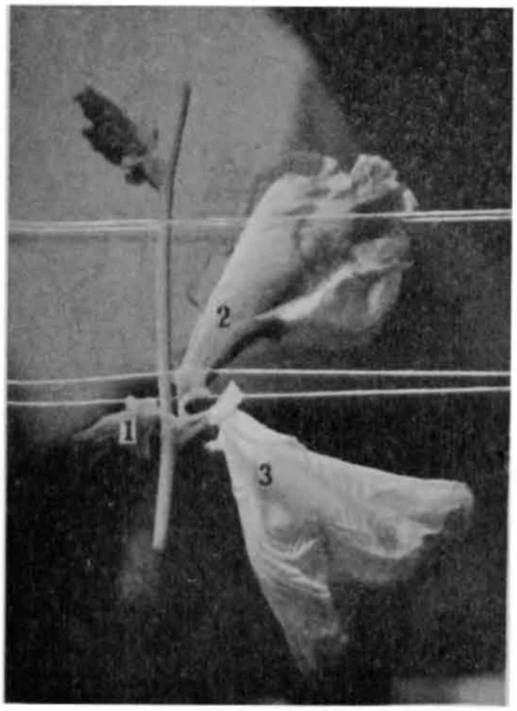
ABSTRACT

Some observations on a garden form of *Clitoria ternatea* Linn. with actinomorphic flowers are recorded in the paper. The haploid chromosome number in the mutant is 8, as in the 'normal' form with papilionaceous flowers. Significant differences were, however, noticed in some characteristics of the pollen of the two forms. The action of the mutant gene is considered to be pleiotropic.

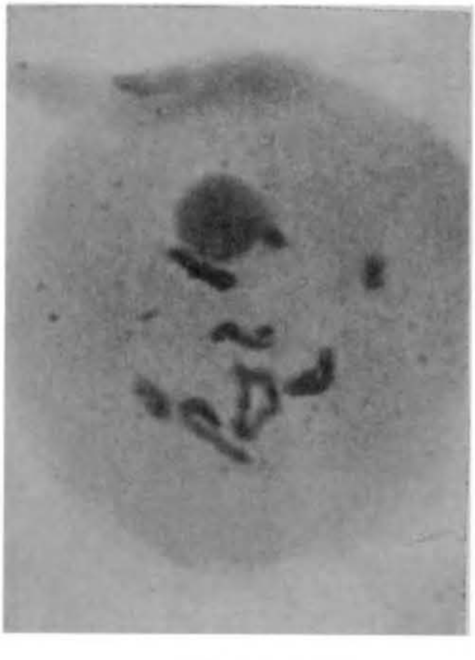
Though *Clitoria ternatea* is described in taxonomic literature as having papilionaceous corolla, a garden form with actinomorphic flowers has been recorded by different investigators (Rant, 1922; Pal, 1960; Sen & Krishnan, 1961). A mutant of this nature in which all flowers were regular with five identical petals and ten free stamens was spotted in a garden at Coimbatore.

Out of 200 flowers examined, three had only four similar petals and eight free stamens instead of the more common numbers of five identical petals and 10 free stamens. Though the flowers were predominantly solitary and axillary, rarely two flowers from the same axil were met with. The second generation had also flowers similar to the parents and the occurrence of tetramerous flowers was not uncommon. Two cases of three flowers arising from the same axil were also encountered (Fig. 1).

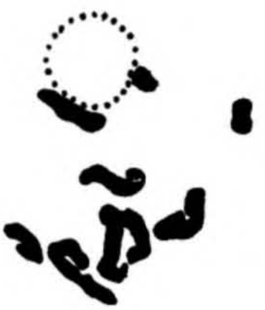
Cytological investigations showed that eight bivalents, two of them being nucleolar, were formed regularly at meiosis in the P.M.C.'s (Figs. 2a & 2b). Three of the bivalents were fairly large, two medium sized and the others small. Normal equitorial plates of the eight bivalents were observed at metaphase I and meiosis was quite regular as in the case of the common form with papilionaceous corolla. The haploid number 8 is, thus, in conformity with earlier reports for the species (Tschechow and Kartaschowa, 1932; Senn, 1938; Frahm-Leliveld, 1953). Significant differences were, however, noticed in case of some characteristics of the pollen of the two forms. The fertility as determined by



1



2a



2b

PLATE I. Fig. 1. A branch showing three flowers arising from the same axil.
Fig. 2*a*. Photomicrograph of diakinensis in pentamerous flower.
Fig. 2*b*. Camera lucida drawing of the same (× 875).

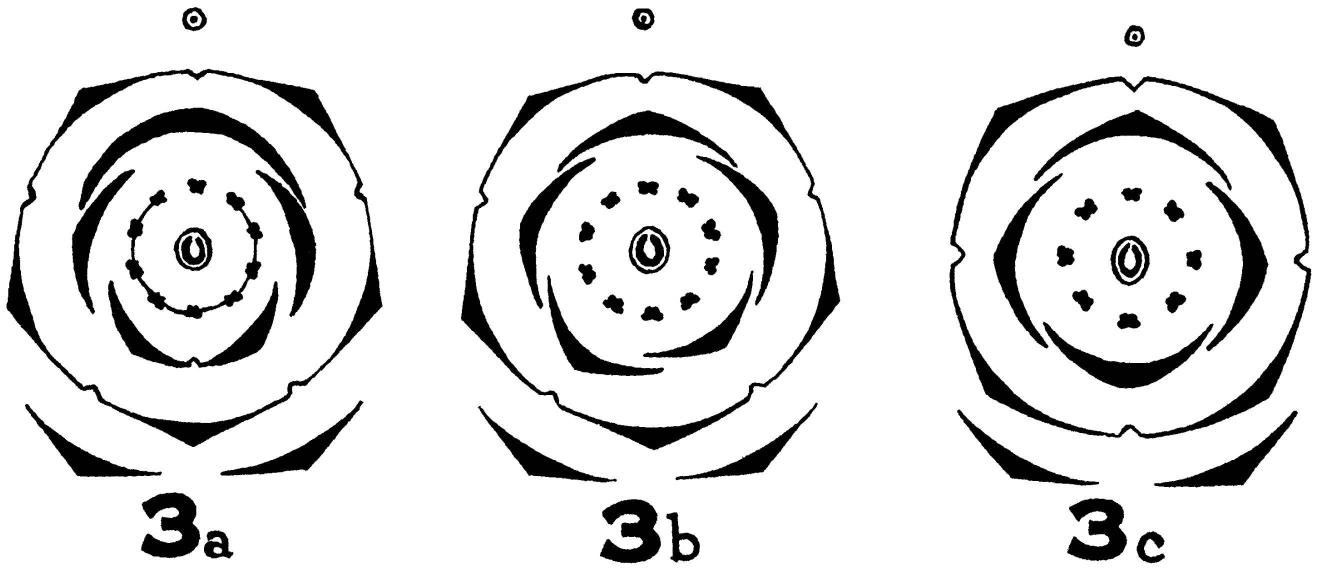


PLATE II. Figs. 3*a*, 3*b*. & 3*c*. Floral diagrams of the normal, pentamerous & tetramerous flowers respectively to show the differences.

stainability in acetocarmine and size of the pollen grains for the three forms *viz.*, 'normal' (zygomorphic), actinomorphic with five petals and actinomorphic with four petals are given below:

Particulars	Normal (zygomorphic) (Fig. 3*a*)	Actinomorphic with 5 petals (Fig. 3*b*)	Actinomorphic with 4 petals (Fig. 3*c*)	C.D.
1. Percentage of fertile pollen	90.8	78.8	..	..
2. Size of pollen grains	58.1μ	77.3μ	61.45μ	2.27 *

The differences in the fertility of the pollen and the sizes of the pollen grains are significant and the greater size appears to be associated with lower fertility.

The occurrence of an exceptional regular flower on a plant of *Clitoria ternatea* which normally had zygomorphic flowers has been recorded by Sirdeshmukh (1955) who considered it only as a tetralogical phenomenon. But the existence of a true breeding form with full *expressivity* and complete *penetrance* of this characteristic which is different from the common papilionaceous type indicates the phenomenon to be of genetic significance. The nature of inheritance of this mutant form has been studied by Rant (1922) and Sen and Krishnan (1961) who obtained evidence to consider the actinomorphic form to be a simple monogenic dominant. The latter workers have emphasized the magnitude of the effect produced by a simple mutation in changing a characteristic of much importance from the taxonomic viewpoint. It is evident from the observations indicated above that the change is not restricted to the form and arrangement of the petals. There is significant difference in the size of the pollen grains and a greater reduction in the fertility of the pollen associated with the change. The sterility is, however, post meiotic and may, probably, be due to differences in the nutritional balance of the developing pollen grains. The action of the mutant gene is manifested in different ways and, therefore, may be considered pleiotropic.

Detailed examination of the characteristics of the hybrids of this mutant with the normal form and the segregants in selfed generations will be taken up to elucidate further the nature of association of the changes noticed.

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